

Virtual Place-making - The re-discovery of architectural places through augmented play

A playful emergence between the real and unreal

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This paper introduces the concept of Virtual Place-making through Urban Gamification for architects and designers as a potential application and approach in architecture and urban design. This introduction will be achieved through introducing Augmented Play and Urban Gamification; identifying the urban gamification components based on the game Pokémon Go; exploring the effect of augmented reality games on the experience of architectural and urban spaces; identifying the role of augmented urban gamification in rediscovering cities and redefining architectural spaces. Finally, an investigation of the existing literature concerning making places is combined with the understanding of the impact of digital technologies to construct an understanding of the concept of Virtual Place-making.

Keywords: *Gamification in Architecture, Internet of Things in Architecture, Augmented Reality in Architecture, User-Participatory in Architecture, Placemaking,*

INTRODUCTION

'Mowing the lawn or waiting in a dentist's office can become enjoyable provided one restructures the activity by providing goals, rules, and the other elements of enjoyment' (Csikszentmihalyi, 2013). This quote highlights the enjoyment effect of introducing gaming mechanics to daily chores. This can apply to any activities regardless of the context, including activities that take place within the urban context such as commuting, walking and sightseeing. Recently, mobile app developers have been utilising gaming mechanics in addition to other technologies such as augmented reality to introduce games that are based

in the urban environment. These games use the real space that is constructed by the architecture to provide a playing experience. It is essential to introduce the concept of *Augmented Play* to build the understanding of such phenomena.

Augmented Play

The availability of 4G networks and the proposition of the following generation of wireless systems provides a new standard for faster data exchange and better implementation of the *Internet of things* applications. More devices are being wirelessly connected. This connection provides location-based ser-



Figure 1
A conceptual
montage showing
the fusion of the
Virtual and the Real
on the University of
Lincoln campus, UK

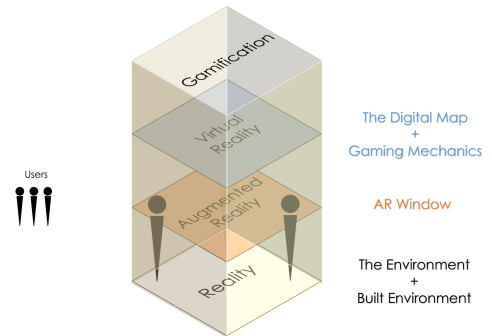
Figure 2
Gamification
between Reality
and Virtual Reality

vices and mapping which are utilised by many applications including games. Mobile games started to utilise location-based services since 2000 (Rashid et al., 2006). The concept of location-based games is not new. What is considered new is to provide an augmented location-based gameplay experience within arm's reach to everyone in the urban fabric. Examples of these released mobile phone games are 'Ingress' by 'Niantic', 'Jurassic World Alive' by 'Ludia', 'The Walk' by 'Every Step Counts', 'Zombies, Run!' by 'Six to Start' and 'Walkr' by 'Fourdesire'. One of the games which stood out and gained popularity is Pokémon Go. The game was released by Niantic in 2016. In the same year, the game downloads and usages surpassed the use of the social media platform Twitter in the US [1]. This quantification shows the popularity of the game and the impact it has on users.

While this game was released for entertaining purposes, it brought few extra perks that affected different aspects of its players' lifestyles. One of these perks is allowing them to have a new experience of wandering around in the urban fabric, moving from one stop to another looking for gaming rewards and naturally re-discovering the city and its architecture from a pedestrian level (Figure 1). The mobile game offers the possibility of interacting with real-life monuments such as buildings and architectural monuments through the game interface. Those architectural elements are recreated in the virtual environment as virtual monuments and are referred to as 'Poke gym' and 'Poke-stops'. Each 'Poke-stop' rewards the gamer with game prizes such as items and tools once the gamer interacts with the virtual monument within a specific range of the actual architectural monument. In such interaction, the gamer interacts with three layers, a reality layer, a virtual reality (VR) layer and an augmented reality (AR) layer which allows the gamer to realise the whole experience through the hybrid bridging between reality and VR. The reality layer represents the environment and the built environment, the virtual reality layer represents the digital map and the gaming mechanics. The AR layer happens through the use of the de-

vice camera at certain places in the game. The gamer is restricted to the game programmed mechanics, however, there is freedom in the choices of the play. See Figure 2.

The *Augmented Play* takes place in an urban context. Thus, it is essential to introduce the concepts of *Urban Gamification* and the *Virtual Place-making*.



URBAN GAMIFICATION AND VIRTUAL PLACE-MAKING

As mentioned the *Augmented Play* happens within an urban context which led to the emergence of two concepts: *Urban Gamification* and *Virtual Place-Making*. In the following section, an investigation of these concepts is presented.

Urban Gamification

Gamification in the urban environment powers the Augmented Play. Gamification is defined as 'the use of video game elements in non-gaming systems to improve user experience and user engagement' (Detterding et al., 2011). In the urban fabric, the use of gamification affects the engagement and the experience of architecture and the built environment while providing an interface for information. The building, streets and landscapes become the level of which the game takes place

This engagement can be justified as an extended perk for using AR technology, but that is not quietly accurate as significant part of the interaction is de-

rived by the gaming elements such as the reward system, the levelling system and the peer competition. There are various components of which makes these games urban engaging (Figure 3). In the following section, these components are classified and described.

Urban Gamification Framework

In order to understand how the urban gamification in the game is created, an investigation of the in-game features and components is realised. According to the analysis of the Pokemon go game, 5 main components are identified: Characteristic, Environmental, Built Environmental, Gaming Mechanics and AR Window.

- **Characteristic**

The characteristics component has two sub-components: Personal Avatar (Personal Representation) and Companion Avatar (Virtual Pet):

- Personal Avatar (Personal Representation)

The avatar is chosen by the players to represent them in the virtual map. The users choose the gender and the appearance (style) of the avatar and the team of which they want to join. The players have no direct control over the avatar as it follows their movement.

- Companion Avatar (Virtual Companion)

The players choose their favourite companion at the beginning of the game. The choices of these companions grow as the players advance in the game and collect more virtual pets. The companion provides a walkable company and reflects the personal player choice. Also, the virtual companions allow users to compete (battle) in the game.



- **Environmental**

The environmental component has three main sub-components: the digital map, the weather simulator and the virtual inhabitants. The environmental component is based on a real-world map. A visually-enhanced digital map is utilised in the game to represent the real context. In this map, the users can track their position in the urban and rural context. Also, they can move the avatar based on their real movement and actual location in the world. The weather simulator mimics the weather condition that is happening in the real environment inside the game. For example, a rainy day will be simulated as a rainy day

Figure 4
An Ingame
Screenshot of
Pokemon Go
Showing a Rainy
Day in the
Environment

in the game (Figure 4). The weather simulator affects the type of virtual inhabitants encountered by the user. The virtual inhabitants are randomly placed virtual animals of which appear to the users when encountered at random locations through their walking in the environment. Those inhabitants can be caught by the user and added to their pet collections.

• **Built Environmental**

The built environment is based on the real space that is created by the architecture and the urban context. However new virtual places are introduced and placed on existing architectural monuments. These places are resembled by public stations (Pokestops) and public playgrounds (Pokemon Gyms). These places are important parts of the game mechanism. Users often visit these to collect rewards or compete to gain the highest rank in the gym.

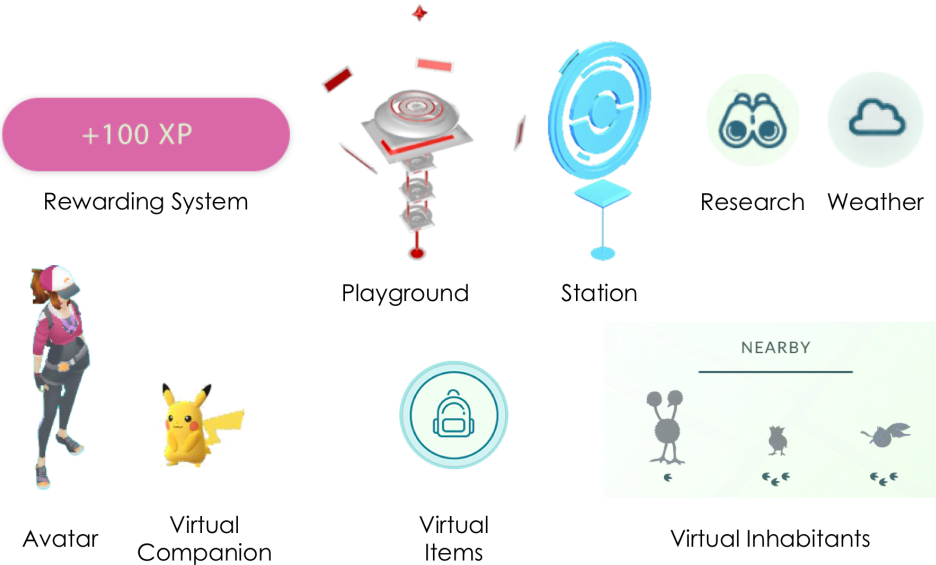
• **Gaming Mechanics**

The gaming mechanics is based on a collection system, a rewarding system and an exploration system. The collection system allows the users to collect virtual pets and items that allow the advancement in the game. The rewarding system rewards the users with extra perks and unlocks new achievements which add to their collection. The rewarding system is represented by levelling experience points (XP), medals and trophies. The exploration system encourages users to explore and achieve some in-game tasks which grant rewards once completed. The research progress represents the exploration system.

• **AR Window**

This is the feature that allows the users to switch on the AR feature. The AR Window utilises the mobile camera to allow an augmented playing experience in the built environment. See Figure 5.

Figure 3
Urban Gamification
Components in
Pokemon Go game





This framework is an initial realisation of the components based on the Pokemon Go application analysis. It is not a final framework, and there is a need to develop it further based on other cases and applications. See Figure 6.

Virtual-Reality Emergence

The Virtual-Reality emergence and interplay in the game happen on two different levels: cognition-based, and technology-based.

• Cognition-based

The game user creates the connection between reality and virtuality in his mind with the aid of the following features:

1. Map-based location tracking. The map-based tracking creates a parallel environment allowing the gamer to relate the virtual surrounding in the game to the physical surrounding of the real life.
2. Weather Imitator. The game is designed to imitate real-life conditions in the game. A rainy day in real life will lead to a rainy day in the game which affects the types of encountered inhabitants

• Technology-based

The application aids the users in creating the connection between reality and virtuality utilising the following features:

1. Visually-enhanced Digital Map. The digital map design and representation, including the colour choice, invite the user to a parallel reality that enhances the experience and the observation of the real built environment.
2. AR Window. This switch allows the game to use the device's camera and to capture the surrounding as a background for the virtual inhabitants.

Figure 5
An Ingame
Screenshot of
Pokemon Go AR
Feature Turned on
When Encountering
a Virtual Inhabitant

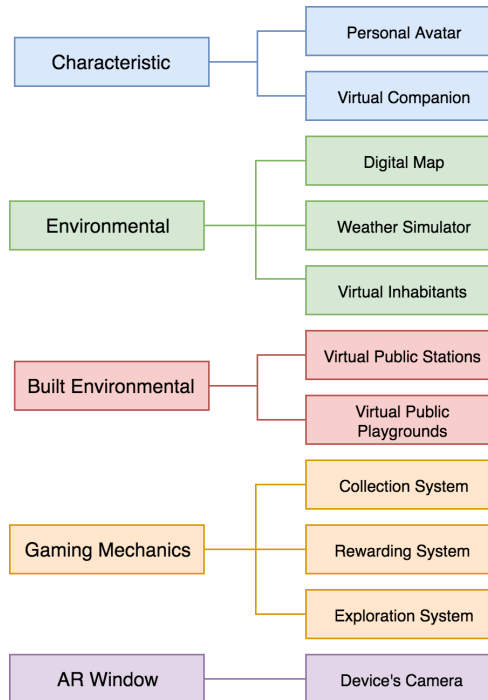


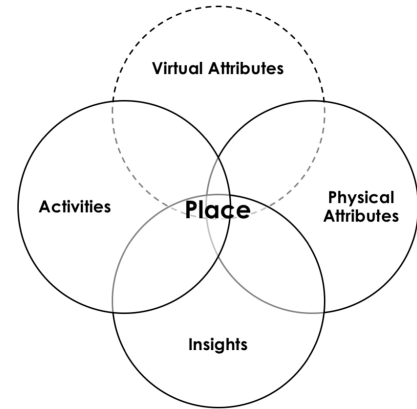
Figure 6
The Initial Urban
Gamification
Framework Based
on the Analysis of
Pokemon Go
Application

Virtual Place-making

Place-making is “the way in which all human beings transform the places they find themselves into the places where they live.” (Schneekloth & Shibley, 1995). This definition describes place-making as the process by which humans transform the tangible space that surrounds them into a living place that hosts their activities. In the pursuit of identifying the factors that affect the sense and the making of place, Falahat (2006) identified the four factors: physical features, individual features, activities and meanings. Punter (1991) identified three factors: form, activities and meanings. Canter (1977) identified three factors: form, activities and conceptions. These factors have similarities; they highlight the physical attributes of space, the activity within the space and the human’s insight whether through meaning or imagination.

With the advancement of technology, space gain different dimensions and different interpretations. One of these differences is that space is not tied to time and is not limited to a specific location that is physically bounded. Thus, new types of space emerged. An example of these spaces is the Cyberspace and the Augmented Space (Chan, 2010). These spaces have virtual and augmented attributes. They are connected beyond the time and the location. And there are activities which take place in such spaces. These activities have different types. There are social, entertainment and even educational activities. These activities are virtual. However, they trigger human insights as effectively as physical activities. Negroponte (1995) describes the disruptive effect caused by digital technologies on the understanding of space by the notion of ‘place without space’. This description can be observed nowadays. An example of that is the digital presence of individuals on social media and online spaces. Anyone can zone out of a social gathering through the use of the mobile phone. The mobile screen allows the creation of a virtual place in which the user seeks comfort. Accordingly, It is possible to propose that a place can be constructed virtually. This place is not limited to a physical presence but can be formed and re-

alised using digital technologies. Also, It triggers human insights and allows activities whether it is virtual or physical. The construction of this place is Virtual-Placemaking. See Figure 7.



The virtual placemaking can be achieved in the urban environment through Gamification. Gamification can transfer the urban space to an urban place through the digital value that is augmented through the digital application which stimulates the realisation of the real architectural values and adds to them. The concept of the digital value is introduced in Qabshoqa (2018).

Games have a motivational effect on their users (Glover, 2013) which increases their engagement and participation level. They are defined as “a form of participatory, or interactive, entertainment” (Rollings & Adams, 2003). This definition highlights another aspect of utilising these games as tools for participation. Participation is an essential component of placemaking. Placemaking has different definitions. It can be defined as “a collaborative process by which People can shape their public realm in order to maximize shared value, facilitates creative patterns of use, paying particular attention to the physical, cultural, and social identities that define a place and sup-

Figure 7
A Proposed Virtual
Place-making
Model

port its ongoing evolution". Pokémon GO can be seen as a representation of the collective and creative method to make a place and communicate social values (Hjorth & Richardson, 2017).

The concept of virtual placemaking is not limited to the use of mobile devices but also applicable to all sort of technologies that support the crossing between the virtual and the real such as augmented reality glasses and peripheral devices.

The Impact of Urban Gamification and Virtual Place-making

Researches in AR technology in mobile phones showed that using AR applications in mobile devices improves people navigation and experience (Lee et al., 2012; Rehl et al., 2012). These findings were linked to the data-embedded in location-based services and the concept of layers, where such technology creates a new layer that reengages, reproduces and re-appropriates public spaces through the projection of augmented content and the possibility to communicate various information in private and public (Liao & Humphreys, 2015). An observed example of this effect on navigation is locating a building according to its proximity to a Pokemon Go Gym. Or advertising the location of an establishment based on the nearest PokeStop.

Recent studies reported health benefits of using such games. Benefits include increased exercise, socialisation, and outdoor activity (Althoff et al., 2016; Scholz & Smith, 2016; Tatenno et al., 2016).

The motivational effect of such games can be utilised in participatory design approaches in the place-making process. An example of this participatory approach appeared in the development of the Pokemon Go game. The developers used landmarks provided by users from one of their previous augmented reality games "Ingress" [2]. This re-use of data that is provided for one application in another application presents collective users' participation and introduces the concept of data recycling, which could be of tremendous use for architects and designers. Since architects and urban designers hold

responsibilities for the current reality of architectural spaces, such approach holds the potential for assessing and creating augmented spaces. These applications and games as part of the Internet of Things can be recognised as interfaces for applications of data-driven design in architecture (Qabshoqa et al., 2017). The application provides a user-focused experience and allows designers to gain better insight into the actual use of urban spaces. Also, it permits them to reverse-engineer the process to promote the visit of certain urban spaces by creating virtual gaming monuments that endorse them based on a digital value assessment.

In 2016, insights gained from a survey of Pokemon Go players in the US [3]. The insights include contributing to the friendliness of the place, provide a common ground for racial and gender equity, reduce idleness and encourage activity in individuals.

These studies do not contribute directly to the experience of architectural and urban spaces. However, they cannot be ignored as the impact they have directly affect aspects of experiencing and making places. From the previous discussion, it is possible to conclude the impact of Urban Gamification on the experience of architectural and urban spaces as follows:

- Positive impact on Navigation and place location.
- Positive impact on the health and well-being of urban residents.
- Provide an augmented platform to make places based on the virtual spaces.
- Provide an interface to assess the urban and architectural spaces based on the virtual activity.
- Provide a public augmented space and playground which promotes equity.

CONCLUSION

Games focus on the users and the users' experience. They are designed to grab their attention and keep them entertained (Totten, 2008). This focus on the

user experience is essential in architecture and the built environment. Architects aim is to design for users. However, the built environment often disregards users experience and focuses on the physical aspects of space due to various factors including economic and legislative ones. The virtual environment has a potential to be the starting point for focusing on users' experience and making places within the existing spaces. It is relatively an affordable method with great potential for enhancing user's and occupant's experience and reviving urban spaces.

Pokemon Go as a game is still considered popular among its users. However, this game could be a fad that went viral and will fade away soon. The value of this research is not to focus on the game but to utilise it as a pilot study to develop more profound knowledge with regards to augmented spaces, virtual places and people interactions. The game was chosen for its vast leading popularity and the broad base of users.

For future research, there is a plan to develop and test the urban gamification framework based on further cases studies. Also, there is an aim to implement the framework within the Building Information Modelling environment where virtual places are assessed as information layers in the BIM model.

In this paper, an introduction and discussion of the Urban Gamification and Virtual Placemaking concepts are presented. The Urban Gamification framework sets an initial understanding of gaming elements which can be utilised in the architectural and the urban design to construct virtual places. The paper emphasises the impact of augmented and virtual technologies on space and the role that mobile devices play in bridging reality and virtuality.

The virtual environment is as important as the built environment in creating places. There is a need to expand its architectural application and to assess and utilise it in design.

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